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PATENT  
TS7564 (US)  
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of )  
ANDREW JOHN HOLMES and )  
CAMERON WILLIAM WATSON )  
Serial No. 09/648,325 ) Group Art Unit 1764  
Filed August 25, 2000 ) Examiner J. D. Johnson  
HYDRAULIC FLUID )  
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COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, DC 20231

Sir:

DECLARATION OF DR. RICHARD DIXON

I am a research scientist employed by Shell International Petroleum Company Limited in Chester, United Kingdom.

I received a Ph.D. degree in Chemistry from the University of Edinburgh in 1997. My doctoral research work focused on catalysis of ethylene. My thesis dissertation was entitled "Reflection Absorption Infra-Red Spectroscopy investigations on the Ni(111) surface". All of this research was in the field of petrochemicals, sponsored by a petrochemicals company.

I have been employed as a research chemist with Shell Research Limited in the lubricants and hydraulic fluids area since 1996.

I am employed as a research scientist and Technology Manager in its Lubricants division. In this capacity I am involved in the development of new products such as lubricants and hydraulic fluids.

I am an author of publications, in the lubricants and hydraulic fluids area. Some of the publications are as follows:

SAE 2002-01-1456, Developments in Shear Stable Hydraulic Fluids, R.T. Dixon and K.J. Young, Shell Global Solutions, presented in Las Vegas, USA.

SAE 2000-01-2541 Environmental Standards for Biodegradable Hydraulic Fluids and Correlation of Laboratory and Field Performance, N. Battersby, R.T. Dixon, S. Greenall, C.W. Watson and K.J. Young, J Ehn, T. Marougy, presented in Milwaukee USA

Based on my education and experience, I am qualified to express the opinions that I set out below. In considering the matters set out herein, I reviewed,

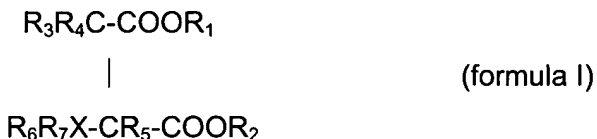
- a) The Application;
- b) The Decision on Appeal;
- c) The Examiner's Answer;
- d) United States Patent No. 4,462,918 to Matthews et al. ("Matthews"), which the examiner cited in the Examiner's Answer;
- e) United States Patent No. 4,627,928 to Karn ("Karn"), which the examiner cited in the Examiner's Answer;
- f) European Patent Application No. 0,434,464 to Waters et al. ("Waters"), which the examiner cited in the Examiner's Answer; and
- g) United States Patent No. 6,114,288 to Fujitsu et al. ("Fujitsu"), which the examiner cited in the Examiner's Answer.

I believe that the claimed invention to be a novel and unobvious advance in the area of hydraulic fluids.

The invention described in the Application relates to a hydraulic fluid comprising a lubricant base oil with the particular combination with magnesium salicylate, zinc dithiophosphate; and, a compound of formula I to obtain improved performance at low load, thermal stability, and less sludge and deposits formation. Applicants' formulations contain ash producing compounds such as magnesium salicylate and zinc dithiophosphate. Historically zinc dithiophosphate has been used in large quantity to improve wear resistance.

It is unexpected to have a hydraulic fluid comprising low amounts of zinc dithiophosphate ("ZnDTP") anti-wear agent to have good protection against wear. It is unexpected that the hydraulic fluid comprising a lubricant base oil in combination with

- (a) from 0.001 to at most 1 %wt of magnesium salicylate,
- (b) from 0.01 to at most 1%wt of zinc dithiophosphate; and,
- (c) from 0.001 to 5 %wt of a compound according to the following formula I



in which R<sub>1</sub> and R<sub>2</sub> are each an alkyl of 3 to 6 carbon atoms; R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> are each hydrogen; X is N and R<sub>6</sub> and R<sub>7</sub> are each an alkyl of 15 to 20 carbon atoms, or an acyl group derived from a saturated or unsaturated carboxylic acid containing 4 to 10 carbon atoms, at least one of R<sub>6</sub> and R<sub>7</sub> being an acyl group, deliver extended low wear over long period of low load.

**In the Examiner's Answer and in the Decision on Appeal claims 1 and 4-6 are rejected as obvious over Matthews in view of Waters and Kahn.** I have been asked to explain differences between the teachings of Matthews, Waters and Kahn and those of the invention described in the Application. Below I set out how, in my opinion, a skilled person would construe Matthews, Waters and Kahn, and differences in the fluids taught by Matthews, Waters and Kahn and the Application.

The Matthews patent deals with the combination of ZnDTP and acidic antirust agent as a means to reduce wear. It makes no mention of the use of salicylates, and wear test is run to standard length. The key difference is the Application utilizes Magnesium salicylate to deliver extended low wear over long period of low load. In my opinion, a person skilled in the art will understand that in the conventional ZnDTP anti-wear agent containing formulation, you will expect significant increase in wear beyond the standard 250 hours test. Whereas the formulation of the Application shows constant wear over 1000 hours that is unexpected. Further, in the Application, it was discovered that at low load (wear at idle condition) the hydraulic fluids have low wear, which is unexpected in my opinion.

The Waters patent aims at the formulation of ashless hydraulic fluids. In an ashless formulation, by definition, there are no metals present and hence no ash after laboratory or commercial combustion of the fluid. Therefore, there can be no metal such as ZnDTP or Magnesium present in an ashless formulation and a person skilled in the art, in my opinion, will not seek for a solution of an ash-containing formulation from an ashless formulation. There are different industry requirements and chemistry involved between ashless and ash-containing formulation.

The Karn patent aimed at protecting the method of making magnesium salicylates. In column 1, lines 39-41 state that "magnesium salts either alone or in combination as, e.g. dispersants, detergents or antioxidants in oils or fuels, etc with other known additives." The invention does not mention wear performance improvements or antiwear agents. The discussion of lubricant properties then focuses again on "various dispersants and detergents" in column 47 and the need for improvement of these properties. In my opinion, a skilled person would understand that this patent deals with fuel and lubricant additives in general and is not directed to hydraulic fluids or to wear performance.

Thus, in my opinion, a skilled person would readily understand that ashless hydraulic fluid formulations such as Waters are significantly different from the applicants formulation containing ash-producing metals. Further, in my opinion, a skilled person would understand the significance of a low ZnDTP formulation having good extended low wear over long period of low load as can be seen at Table 1 composition 1 as claimed in the present application .

**In the Examiner's Answer and in the Decision on Appeal claims 1 and 4-6 are rejected as obvious over Fujitsu in view of Matthews.** I have been asked to explain differences between the teachings of Matthews, Waters and Kahn and those of the invention described in the Application. Below I set out how, in my opinion, a skilled person would construe Matthews, Waters and Kahn, and differences in the fluids taught by Fujitsu, and Matthews and the Application.

The Fujitsu patent deals with lubricating oil for internal combustion engines. As such in my opinion, a skilled person would understand that it is not relevant to hydraulics and such teachings can not be translated to hydraulic fluids. Fujitsu is targeted at the moving valve parts in four-stroke engines, specifically mentioning cam-and-tappet contact. The tests described in this patent are for "appraising the quality and performance of lubricating oils for internal combustion engines" and does not translate to hydraulic pumps. In column 2, line 55 the Fujitsu invention is summarized as one specifically to "overcome the scuffing and wear resistance of moving valve parts under the above mentioned severe lubrication conditions", therefore, in my opinion, a skilled person would understand that this has nothing to do with hydraulic system wear where scuffing in this contact is not a common issue. Further Fujitsu uses larger amounts of alkyl salicylates.

The Matthews patent is discussed above.

**In sum, it is my opinion that the fluids described by Matthews, Waters, Karn, and Fujitsu is different than the hydraulic fluids described in the Application for the above reasons.** It is unexpected to have a hydraulic fluid comprising low amounts of ZnDTP anti-wear agent to have good protection against wear. It is unexpected that the hydraulic fluid comprising a lubricant base oil in combination with

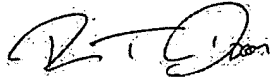
- (d) from 0.001 to at most 1 %wt of magnesium salicylate,
- (e) from 0.01 to at most 1%wt of zinc dithiophosphate; and,
- (f) from 0.001 to 5 %wt of a compound according to the following formula I



in which R<sub>1</sub> and R<sub>2</sub> are each an alkyl of 3 to 6 carbon atoms; R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> are each hydrogen; X is N and R<sub>6</sub> and R<sub>7</sub> are each an alkyl of 15 to 20 carbon atoms, or an acyl group derived from a saturated or unsaturated carboxylic acid containing 4 to 10 carbon atoms, at least one of R<sub>6</sub> and R<sub>7</sub> being an acyl group, deliver extended low wear over long period of low load.

THE UNDERSIGNED DECLARES FURTHER that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that willful false statements may jeopardize the validity of the application of any patent issuing thereon.

Date : 27th March 2004



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Dr. Richard Dixon